REMARKS

Applicants appreciate the thorough examination of the present application by the new Examiner, and the new citation of U.S. Patent 6,693,016 to Gutsche et al. In order to advance the present application to allowance, the recitations of Claim 33 have been incorporated into Claim 17, and Claim 33 has been canceled. Therefore, all of the pending independent claims (Claims 17 and 29) recite capacitor fabrication methods wherein an $Si_{1-x}Ge_x$ is formed on a dielectric layer at about 550°C or less. As will be shown below, the newly cited reference Gutsche et al. is silent as to any disclosure of temperature, and the previously cited secondary reference, U.S. Patent 6,184,480 to Economikos et al. describes temperatures for fabrication of germanium or amorphous silicon, but not for $Si_{1-x}Ge_x$. The combination of Gutsche et al. and Economikos et al., therefore, does not describe or suggest the recitations of Claims 17 or 29. Accordingly, Applicants respectfully request allowance of all of the pending claims for the reasons that now will be described.

Claims 17, 26, 28, 29 and 34 Are Not Anticipated by Gutsche et al.

As was noted above, the recitations of Claim 33 have been incorporated into Claim 17, and Claim 33 has been canceled. Accordingly, independent Claims 17 and 29 both recite forming an $Si_{1-x}Ge_x$ layer at about 550°C. In rejecting Claims 17, 26, 28, 29 and 34 under 35 USC §102, Pages 2-3 of the Detailed Action do not allege any disclosure in the newly cited Gutsche et al. reference of any temperatures. Accordingly, independent Claims 17 and 29 are not anticipated by Gutsche et al. Claims 26, 28 and 34 are patentable at least per the patentability of the independent claims from which they depend.

Claims 18-25, 27 and 30-31 Are Patentable Over Gutsche et al. in view of Economikos et al.

Claims 18-25, 27 and 30-31 stand rejected under 35 USC §103(a) as being unpatentable over Gutsche et al. in view of Economikos et al. However, Applicants respectfully wish to point out that it would not be obvious to combine Economikos et al. with Gutsche et al., absent the teaching provided by the present application, because Gutsche et al. relates to capacitor structures that include a silicon-germanium

electrode layer, whereas Economikos et al. describes the use of silicon-germanium to fill deep trenches. Accordingly, there is no motivation to combine Economikos et al. with Gutsche et al., absent the disclosure of the present application.

Moreover, even if combined, the temperatures recited in independent Claims 17 and 29 and dependent Claims 23, 25, 30 and 31 are simply not described or suggested in Gutsche et al. and/or Economikos et al. In particular, as was noted above, Gutsche et al. does not appear to describe any temperatures or temperature ranges. Moreover, in rejecting Claims 23, 25 and 30, the Official Action points to Column 3, line 40-Column 25, line 4 of Economikos et al. However, the disclosed temperatures below 550°C all relate to pure germanium, not to silicon-germanium alloy. In particular, as noted in Economikos et al. Column 3, lines 34-36, the trench fill material **30'** can comprise pure germanium or silicon-germanium alloy. Then, as noted by Economikos et al. Column 3, lines 41-64:

> The germanium or $Si_{1-x}Ge_x$ fill material is typically deposited by a Chemical Vapor Deposition (CVD) process well known in the art. Pure germanium deposition can be achieved using Low Pressure CVD (LPCVD) at a deposition temperature of 350° C. with a GeH_4 partial pressure of 0.2 Pa to 12 Pa to achieve a steady-state deposition rate of 20 Å/min. to 80 Å/min. in either an H_2 or Ar carrier gas in a batch furnace, as described by Kobayashi et al., J. Crystal Growth 174, pp. 686-90 (1997). Other reactive germanium gases or other germanium or $Si_{1-x}Ge_x$, growth processes can be employed. Complete fill is not critical, in this step, because large voids can be tolerated.
>
> The deposition temperature, pressure, and gas flows can be adjusted to tune the process for optimal deposition rate or particulate performance. For reasonable germanium coverage in the trench in a single step, the overall processing range for the LPCVD furnace process is generally 300-500° C. at 0.01-30 Pa GeH_4 partial pressure. Deposition at temperatures above 550° C. and as high as 800° C. is possible, but may tend to give less conformal deposition. Although conformal deposition is helpful, it is not necessary because filling the voids is not a requirement at this step in the process according to the present invention. (Emphasis added.)

Later, at Column 4, lines 44-49, deposition of a cap layer of amorphous or polycrystalline silicon is described:

> The deposited cap layer is generally about 300 Å or more thick, sufficient to prevent oxidation of the germanium fill and serve as a diffusion barrier. Preferably, a deposition temperature in the range

> of 500-550° C. may be used to generate only amorphous silicon and to reduce particle generation. (Emphasis added.)

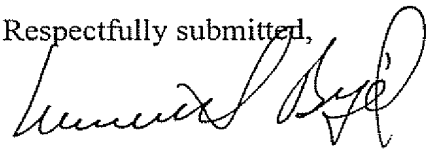
Accordingly, even if Economikos et al. is combined with Gutsche et al., the temperature recitations of Claims 17, 23, 25, 29, 30 or 31 would not be described or suggested for Si-Ge. Accordingly, independent Claims 17 and 29 are patentable, and dependent Claims 23, 25, 30 and 31 are separately patentable, over Gutsche et al. in view of Economikos et al.

Finally, new Claims 35-38 recite ranges of x in the $Si_{1-x}Ge_x$ layer as described, for example, at Page 9, lines 2-4 of the present application. None of the cited references appears to describe or suggest these ranges of x in combination with the recited temperature ranges. Accordingly, new Claims 35-38 are independently patentable.

Conclusion

Applicants again appreciate the thorough examination by the new Examiner, and the citation of the new reference. Applicants have shown above, however, that the primary reference does not appear to describe or suggest any temperatures that are claimed in the independent claims and many of the dependent claims, and that, even if properly combinable, the combination of references does not describe or suggest the temperature recitations of the independent claims and many of the dependent claims. For at least these reasons, Applicants respectfully request withdrawal of the final rejection and allowance of the present application.

Respectfully submitted,



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